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Québec H9H 3L1 (CA). **GIRARD, Yves** [CA/CA]; 16711 Trans-Canada Highway, Kirkland, Québec H9H 3L1 (CA). **MACDONALD, Dwight** [CA/CA]; 16711 Trans-Canada Highway, Kirkland, Québec H9H 3L1 (CA).

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(74) Agents: **OGILVY RENAULT et al.**; Suite 1600, 1981 McGill College Avenue, Montreal, Québec H3A 2Y3 (CA).

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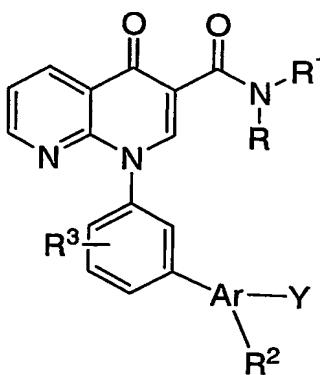
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Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: 4-OXO-1-(3-SUBSTITUTED PHENYL-1,4-DIHYDRO-1,8-NAPHTHYRIDINE-3-CARBOXAMIDE PHOSPHODIESTERASE-4 INHIBITORS



(57) Abstract: Compounds represented by Formula (I) or a pharmaceutically acceptable salt thereof, are phosphodiesterase 4 inhibitors useful in the treatment of asthma and inflammation and useful for the enhancement of cognition.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/ISA 03/01800

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07D471/04 A61K31/4375 A61P25/00 // (C07D471/04, 221:00,
221:00)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07D A61K A61P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 99 07704 A (SUNTORY) 18 February 1999 (1999-02-18) page 2, line 32 -page 3, line 12; claim 1 -----	1,25,32
P, X	WO 02 094823 A (MERCK FROSST CANADA) 28 November 2002 (2002-11-28) claims 1,21-24,27; examples 24,61 -----	1,22-26, 32

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Alfaro Faus, I

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA 03/01800

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

Although claims 25–28 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compounds.
2. Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/CA 03/01800

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 9907704	A	18-02-1999		AU 755350 B2 AU 8560798 A CA 2268190 A1 CN 1239478 T EP 0958297 A1 HU 0001054 A2 WO 9907704 A1 JP 11106385 A US 6297248 B1 US 2002006935 A1		12-12-2002 01-03-1999 18-02-1999 22-12-1999 24-11-1999 28-10-2000 18-02-1999 20-04-1999 02-10-2001 17-01-2002
WO 02094823	A	28-11-2002		WO 02094823 A1 US 2003096829 A1		28-11-2002 22-05-2003